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Factors determining usage-based insurance acceptance - Poland and Spain results

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Abstract. Usage-based insurance (UBI) is based on the idea that customers who are safer drivers should pay less for a policy than those who are less prudent. It is widely assumed that there is an incentive for insurers to use this technology, as it could make riskier drivers more likely to use non-telematics-based insurers. However, this hypothesis has not been verified empirically. In order to fill this research gap, a study (between December 2021 and March 2022) assessing the relationship between driving style and willingness to purchase a UBI-based policy and the relationship between risk propensity and willingness to purchase a UBI-based policy was conducted. The study, in the form of a questionnaire, was conducted in Poland and Spain. The samples consisted of 181 respondents in Poland and 51 in Spain. It was found that individual driving style was correlated with willingness to accept a UBI-based policy that included discounts and surcharges. It was also shown that propensity to risk influences willingness to purchase a UBI-based policy that offers discounts only to some extent. The study used suitable statistical measures and tests such as a chi-square test, U Mann-Whitney U test and a Kruskal-Wallis test. Results are significant for insurance companies that are going to introduce UBI. They allow shaping the product so that potential customers are interested in buying it, which, as research shows, may bring benefits to both insured and insurance companies.

Keywords: insurance telematics, usage-based insurance (ubi), driving behaviour, attitude to risk, incentives, statistical independence tests.

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1. INTRODUCTION

The insurance market is an example of a market where both parties to a transaction suffer from insufficient amount of information. On the one hand, the insurer is not able to determine with certainty whether the customer buying the policy has characteristics that make the probability of damage higher for him. At the same time, he cannot predict whether the customer will change his behaviour after purchasing the policy or not. On the other hand, a client who wants to estimate how much he should pay for an insurance policy either does not have complete information or, at best, knows the possible amount of the potential loss but does not know the probability of its occurrence. As shown by Bernat et al. (2016), the lack of sufficient information in a market transaction may lead to the problem of information asymmetry, which significantly affects the efficiency of resource allocation.

Moreover, perceived information asymmetry can lead to increased consumer uncertainty (Horvath et al., 2021). In the insurance market exists a phenomenon connected with information asymmetry - so-called adverse selection (Akerlof, 1970). Having information about uncertain and changing surroundings can have a positive impact on the effectiveness of decisions (Dankiewicz et al., 2020). It is believed that insurance contracts are concluded more often by people who are exposed to higher claims (Siegelman, 2004) and that high-risk drivers buy policies with greater coverage (Rothschild, Stiglitz, 1976). However, in recent years the question of whether an adverse selection is as strong as was originally assumed has arisen (Chiappori, Salanie, 2000; Dionne et al., 2001), as there is no evidence that high-risk drivers buy greater amounts of auto insurance coverage. Due to the rapid development of connected technologies and the adaptation of big data, a tool that is increasingly used to reduce adverse selection and increase insurers' margin in automobile insurance is a policy contract based not only on traditional statistical models (looking at previous claims, age, city of residence, mileage, etc.) but on individual driving style data originating from telematics devices. The idea behind usage-based-insurance is that customers who are safer drivers should pay less for insurance policies than those who are less prudent. The impact of insurance protection on decisions made depends on the quality of this protection and its availability (Dankiewicz, 2020). Parameters such as speeding, acceleration, braking and turns, total distance driven by the user, the road network type and risky driving hours are typically collected to estimate one's driving style (see e.g. Guillen et al. 2020). It is commonly assumed that there is an incentive for insurers to use the technology, because otherwise another type of adverse selection may arise whereby riskier drivers may be more likely to choose insurers who do not use a telematics system (see e.g. Cather, 2018; Arvidsson, 2011; Karapiperis et al., 2015). However, to our knowledge, the hypothesis that high-risk drivers are not willing to buy policies based on usage has not yet been verified empirically. The aim of this paper is to fill that gap. Based on answers to a 39-question questionnaire, the hypotheses to be tested are:

Hypothesis 1: An individual's self-reported driving style is correlated with willingness to buy a policy contract based on UBI.

Hypothesis 2: An individual's risk propensity affects his/her willingness to buy a policy contract based on UBI.

The second hypothesis evolves from the assumption that a less risk-averse person takes driving decisions that lead to more dangerous situations. Sensation-seeking behaviour especially is assumed to result in reckless driving (e.g. Trimpop, Kirkcaldy, 1997). Because it is difficult to retrieve full information on driving behaviour by means of a questionnaire, risk propensity is therefore used as a complementary indicator of risky driving.

The rest of the paper is organised as follows. Section 2 contains the literature review. In Section 3 we present the research and data collection method. The data analysis and the results are detailed in Section 4. Section 5 contains a summary and concluding remarks on the results obtained.

2. LITERATURE REVIEW

2.1. Factors determining UBI acceptance

Privacy is a widely discussed issue connected with UBI. Some companies use GPS data to monitor drivers' behaviour, while others analyse driving speed data to protect users' location privacy - albeit even in the latter case it is possible to recreate a car's actual route to some extent (Zhou et al., 2019). In both cases, substantial amounts of sensitive information is collected. Consumers may not only fear data leakage outside the insurance company, but may also be reluctant to allow someone from the insurance company to monitor their behaviour (Quintero, Benenson, 2019). That, in turn, could hypothetically lead to a reduced acceptance rate of UBI. However, the results are not conclusive on this matter. Rejikumar found that in India acceptance intentions are not influenced by perceived privacy risk (Rejikumar, 2013). In Serbia, on the other hand, a survey showed that privacy concerns related to the potential abuse of driving behaviour data play an important role in technology acceptance (Milanović et al., 2020). Biener et al. (2020), in an incentivised experiment, obtained results showing that that the impact of the mandatory sharing of live location data reduces the willingness to pay relative to the expected loss by 25 to 50 percentage points, particularly threatening the insurer's profitability from high-frequency risks. It is important to mention that the data being shared did not influence the insurance premium, so the only reason for the drop in WTP could be caused by a reluctance to share private data. According to Derikx et al. (2016), consumers perceive privacy of behaviour and actions as more valuable than privacy of location and space. A survey of Swiss students revealed that 81% of car owners said they would share data about the distances driven, between 30% and approximately 50% of car owners would share data about their style of driving, and only 12% of car owners agreed that they would share their geographical position (Becker, Erny, 2021). Similarly, Taiwanese drivers have a higher level of willingness to provide data on driving behaviour such as rapid acceleration, daily number of drives, and usual time of driving; while data pertaining to where the vehicle is driven is the driving behaviour data that drivers are most unwilling to provide to auto insurers (Fan et al., 2016). A field study conducted in the US revealed that the privacy policy enhancement introduced by insurers was associated with a decline in the adoption cost of consumers and an increase of approximately 10% in the adoption of UBI than would otherwise have occurred. Moreover, a major data breach of credit and debit card data at a discount retailer that occurred in the studied period was associated with a decrease in retention rates among customers currently being monitored (Soleymanian et al., 2021).

As one might assume, demographic factors have a significant influence on the acceptance rate of usage- based insurance. Based on a structured questionnaire, Śliwiński and Kurylowicz (2020) found that declared attitudes were dependent primarily on age, sex and place of residence. In the same research, a strong relationship was also demonstrated with respect to the intensity of the vehicle's use, the amount of the insurance premium paid, and the self- assessment of the respondents' driving skills. However, the data does not appear to indicate unidirectional correlation between variables. According to a study conducted in several European countries and the US (each sample was larger than 500), the acceptance of installing a black box in each country increases with an increase in the salary of the potential customer, and the more the participants drive, the more willing they are to get a black box fitted in their cars (cit. per Dang, 2017). Seger and Figl (2019) showed that people who rated their driving skills higher than those of others are more likely to accept data-driven car insurance contracts. Tselentis et al. (2018) found that people with lower education and aged below 40 years are more likely to choose Pay-As-You-Drive insurance.

2.2. Factors affecting driving style and the accident rate

Road traffic, road type, individual driver characteristics and behaviour, vehicle condition and type, and environmental factors are generally identified as factors influencing the road accident rate. Lord et al. (2005) found an inverse relationship between road density and the number of accidents on a given freeway. Dickerson et al. indicate that while there is a near-proportional relationship at low to moderate traffic flows, the marginal accident rate rises substantially above the average with higher traffic flows (Dickerson et al., 2000). Golob and Recker (2003) demonstrated that accident severity is inversely related to traffic volume. Paefgen et al. have shown that the risk of an accident is higher between 6 p.m. and 9 p.m. and that a higher risk of an accident/collision is associated with both low speeds (0-20 km/h) and high speeds (90-120 km/h) (Paefgen et al., 2014). Abdel-Aty and Radwan (2000) identified heavy traffic volume, speeding, narrow lane width, a larger number of lanes, urban roadway sections, narrow shoulder width and reduced median width as factors that increase the likelihood of accident involvement. Haynes et al. (2007) found that collision numbers were negatively related to road curvature across different districts, and districts with straighter roads had more crashes.

It has been shown that the risk of accidents depends on human factors such as driving skills (license status, term of driving, accident involvement in recent years, driving distance in miles/km), the driver's socio-demographic attributes (gender, age, marital status, personal or family income, commuter status and educational level), and driving manners (the number of traffic accidents in recent years, physical condition of the driver, use of alcohol and drugs, use of a seatbelt, driving beyond the speed limit, failure to stay in the proper lane, passing where prohibited by posted signs and use of a cell phone) (cit. per Azadeh et al., 2016).

2.3. Risk propensity

The propensity to take risks is individual for each person, but certain regularities are observed. In particular, it is believed that people in general are rather risk-averse (Tyszka, Domurat, 2004). Importantly, it is suspected that risk aversion is the hallmark of living creatures that ensures their survival (Battalio, Kagel, & MacDonald, 1985). Despite the fact that the attitude to risk is individualised, there are factors (e.g. demographic) that predispose people to taking risks. Such a trait is, for example, gender. Research by Byrnes, Miller, & Schafer (1999) shows that men are more prone to taking risks than women. However, the tendency toward risky behaviour decreases with age among both men and women (Studenski, 2004). Age and risk attitude are of great importance in the case of drivers, because the literature describes the occurrence of the so-called Young Male Syndrome, which translates into the occurrence of risky behaviour in young men. This syndrome is associated with impulsive behaviour and worsens during competition (Wilson and Daly, 1985).

Another important issue in terms of the occurrence of potentially risky behaviours is excessive optimism (overconfidence) and overestimating one's own skills. The presence of overconfidence has been shown in a survey of drivers where 80% of drivers considered themselves among the best 30% of their ability (Svenson, 1981). Similar results were obtained in studies of drivers in the USA and Sweden, which confirm the occurrence of the overconfidence effect among drivers (McCormick, Walkey, & Green, 1986). In the case of excessive optimism (which is one of the forms of overconfidence), there appears an overestimation of one's own abilities and possibilities, which may lead to risky behaviour on the road. Overestimating one's own abilities, i.e. the Dunning-Kruger effect, is related to the previous two effects. It is related to the fact that unskilled people rate their skills as higher than they really are, while people with higher qualifications tend to underestimate their skills (Kruger & Dunning, 1999). The occurrence of this

effect in the case of drivers, especially those with low skills, may lead to the occurrence of dangerous situations and risky situations.

As already mentioned, it is often assumed that the main recipients of UBI are low-risk drivers. However, setting the amount of the premium based on the UBI may, after all, encourage drivers to limit risky behaviour. Therefore, Śliwiński and Kuryłowicz claim that insurance companies should target their UBI motor insurance offer to specific groups of drivers who pay higher premiums (and at the same time are more prone to risky driving behaviour) (Śliwiński, Kuryłowicz, 2021). This is confirmed by an experimental study conducted by Bolderdijk et al. (2011) in which 141 car insurance policy holders in the Netherlands participated. Subjects' cars were equipped with telematics systems, and the test group was divided into an experimental group and a control group. The experimental group was offered a total of €200 for compliance with road rules (either as a payment of funds or as a reduction in policy costs) and participants in the control group were told that they would receive a €200 discount (as a reduction in policy costs) at the end of the experiment, regardless of their driving behaviour. The study showed that members of the experimental group reduced their speed, but did not reduce mileage or time spent driving at night. After the experiment was halted and the financial incentives were removed, the experimental group increased their driving speeds to the previous levels. These results suggest that behavioural change is due to appropriate motivation and not the result of attitude. Similar conclusions about the effectiveness of policy pricing based on driving style were drawn by Reimers and Shiller (2018), who found evidence that the number of vehicles in fatal accidents per registered vehicle decreases significantly — by 1.6% for each additional firm offering Pay-How-You-Drive insurance programmes — implying enrolees reduce their risk of fatal accidents by approximately 50%.

As stated earlier, to our knowledge, there is no publication which would directly link driving style with the desire to buy UBI. Pugnetti and Elmer (2021) showed that riskier driving styles are correlated with lower levels of preference for sharing information with insurance companies. That study, conducted among 900 Swiss students, seems closest to the present paper in terms of the stated research purpose. However, in Pugnetti and Elmer's questionnaire, the attention of respondents is focused directly on their willingness to share information and not on the purchase of insurance. Sahebi and Nassiri (2017) checked the acceptance rate of connected-vehicle systems as an addition to UBI and claim that more risk-averse drivers would accept the new UBI scheme more willingly than others would.

3. RESEARCH METHOD AND DATA

Based on literature studies, hypotheses were put forward that the acceptability rate of usage-based insurance is connected with risk propensity and the driver's risk profile. More precisely, we aim to verify the hypothesis that the more risk-averse a person is, the more willing he/she will be to buy a policy that is priced based on data from a telematics device. Furthermore, because we believe that a driver's risk profile is correlated with risk propensity, the second hypothesis states that the less risky a driver's profile, the greater the willingness to buy a policy that is priced based on data from a telematics device. To verify those hypotheses, we conducted surveys among Polish and Spanish citizens in a form of a questionnaire that is described below.

The questionnaire

The questionnaire is divided into four parts[1]. The first part includes demographic questions regarding age, place of residence, marital status, highest level of education completed, and parenthood. The choice of

[1] The questionnaire can be found in Appendix I

those variable was dictated by two rationale. Firstly, many of the abovementioned factors are known to influence risk propensity (e.g. Ronay and Kim, 2006; Mather et al., 2012), secondly some of them have been identified as variables affecting usage of new technologies (eg. Belas et al., 2015; Kwarteng, Pilik, 2016). The second part relates to levels of acceptance of usage-based-insurance. There are a total of six questions in which the respondents have to answer the question of whether they would agree to install a device monitoring their driving style in their car, if the data from this device influenced the amount of the insurance premium for their vehicle. In the scenario posed in the first question, it is possible to increase or decrease the insurance premium depending on the quality of the drive. The following five questions ask about one's willingness to accept the installation of a monitoring device in case only a lower insurance premium is possible when one's driving style is rated as safe. The discounts offered in the questions are presented in ascending order from 10% rising to 50%. The third part of the survey consists of questions regarding the driving style of respondents. It includes questions about speeding and braking that, as mentioned above, are commonly taken into account when assessing the probability of participating in an accident and when pricing UBI policies. The fourth and final part comes from a Domain-Specific Risk-Taking questionnaire (Blais, Weber, 2006). The DOSPERT scale is a psychometric scale that assesses risk-taking in five content domains: financial decisions, health/safety, recreational, ethical, and social decisions. However, for the purpose of the present study, only the first three domains were considered significant, while ethical and social questions were excluded.

Specification of variables

Questions pertaining to driving style (questions 13-17) were questions about frequency of behaviours. For further analysis, the answers to those questions were ranked on a scale from 1 to 5, where 1 was an answer beginning with 'Never' and 5 was an answer beginning with 'Always'. Answers to the remaining questions about driving experience, always being in a hurry, privacy needs and risk propensity (from 19 to 39) were given on a seven-point Likert scale. In order to find a relationship between the willingness to buy UBI insurance, risk propensity and driving behaviour, new variables were created. The variable DRIVING STYLE is a sum of ranks for questions about driving behaviour (13-17). To measure the level of willingness to accept UBI, the variable ACCEPTANCE was created. ACCEPTANCE is evaluated on a six-point scale, whereby 1 means a respondent is willing to accept an offer of UBI with the chance of obtaining a 10% discount, 2 means a respondent is willing to accept an offer of UBI with the chance of obtaining a 20% discount, 3 means a respondent is willing to accept an offer of UBI with the chance of obtaining a 30% discount, 4 means a respondent is willing to accept an offer of UBI with the chance of obtaining a 40% discount, 5 means a respondent is willing to accept an offer of UBI with the chance of obtaining a 50% discount, and 6 means that a respondent was not willing to accept the offer with a 50% discount. The next three variables were created to measure financial risk propensity (FINANCIAL), health/safety risk propensity (SAFETY) and recreational risk propensity (RECREATIONAL), and they were the sums of ranks for the questions belonging to the specified area (questions 22-39 according to the DOSPERT scale).

4. RESULTS

Data and subjects - Poland

The data was collected via an internet platform in the period from December 1, 2021 until January 31, 2022. Because of the problem being analysed, the survey was directed only to those who have owned a car in the last five years. Overall, answers from 180 respondents were collected. 58% of the sample were men and 42% were women. The average age of respondents was 30.2 years (SD 10.9). 27.6% were single, and 71.8% did not have children. Additional information about residence and highest level of education attained is given in Appendix II in Tables A and B respectively. It is important to note that the results cannot be considered representative for Poland in any case. Although the sample is large, it does not reflect the structure of Polish society. However, the authors did not aim to estimate the percentage of people willing to agree to UBI for the entire country, but to check whether acceptance of UBI is connected with levels of selected variables. For example, the existence of correlation between two variables in the sample will only be interpreted as proof that somewhere in society there are individuals for whom one variable is dependent on the other. The relative youth of most respondents should also be taken into account. The reason for targeting young people in the survey was the belief that the wider introduction to insurers' offer of UBI is yet to come and it is those in the aforementioned age bracket who will make decisions about UBI in the future.

Data and subjects – Spain

The data was collected via an internet platform in the period from December 1, 2021 until March 15, 2022. As in Poland, the survey was directed only to those who have owned a car in the last five years. Overall, answers from 51 respondents were collected. 51% of the sample were men and 49% were women. The average age of respondents was 35.65 years (SD 11.74). 25.5% were single, and 62.75% did not have children. Additional information about residence and highest level of education attained is given in Appendix II in Tables C and D respectively.

Results - Poland

As was mentioned earlier, a new variable entitled ACCEPTANCE was created to measure willingness to accept UBI. However, apart from that variable, there is also another variable that can indicate attitude towards UBI. This is a binary variable, the values of which result from the answers to question number 7 ('Would you agree to install a device monitoring your driving style in your car, if the data from this device influenced the amount of the insurance premium for your vehicle? If so, for a safer than average driving style your premium would be lower than the average, and for a less safe than average driving style your premium would be higher than the average.'). It seems that a person who agrees to the terms of insurance in that question should also agree to the terms offered in the following questions, where one's premium can only be lowered. However, the results show that this is not the case. For example, 41 people that agreed to the terms in both question 7 and question 8 (with a 10% discount), 86 people did not agree to the terms in any of those questions, but there were also 21 people who would agree to the terms offered in question 7 but not in question 8. One of the possible explanations is that they might have expected a larger reduction in the insurance premium. For that reason, the answers to question 7 are analysed separately and not included in the variable ACCEPTANCE.

In order to check which factors affect the answers to question 7, chi-squared tests were conducted for qualitative variables and U-Mann-Whitney tests for ordinal variables (see Table 1). Based on that, it may be

stated that there are no differences in willingness to accept a UBI policy proposal between men and women (p=0.71), place of residence (p=0.21) and marital status (p=0.33). A difference was found for the highest level of education completed (p=0.011) and between respondents with and without children (p=0.043035). Among people with children, 46% were willing to buy that kind of insurance, while among those without children it was only 30%. This may be connected with the average age of those who were willing to buy UBI (32.42 years, n=62) and those who did not want to buy (28.91 years, n=118) as the former is significantly higher than the latter (p=0.0195). According to the U-Mann-Whitney test, there are differences between those who agreed to buy UBI in terms of the variable DRIVING STYLE (p=0.012). The median value of DRIVING STYLE is 12 for those who would agree to buy the policy and 13 for those who would not buy it (because of the ranks assigned to particular answers, the variable is constructed in such a way that a higher score means a less safe driving style). Inside that variable, differences were noticed mainly between speeding in built-up areas (p=0.029) and night driving (p=0.009). A significant difference was also found in valuing one's privacy (p=0.000008). The median rank for those not willing to buy a UBI policy is 7 (the highest level of agreement with the statement "I highly value my privacy") and the median rank for those willing to buy it is 5.5. Surprisingly, no differences were found in terms of risk propensity, regardless of the domain. Looking at individual questions only, the answers to question 24 (How likely would you be to engage in the following: Invest 10% of your annual income in a trust with an average rate of growth) differed significantly (p=0.016). The median rank for those who would buy a UBI policy is 3 and for those who would not buy it 2.5. Because driving style is often linked to risk propensity and the research showed that willingness to buy UBI policy is connected with DRIVING STYLE and not risk propensity in any domain, it seemed necessary to define the relationship between those variables in the sample studied. The rank correlation coefficients between the variable DRIVING STYLE and risk propensity were equal to 0.176 (p<0.02), 0.381 (p<0.01) and 0.283 (p<0.01) for FINANCIAL, SAFETY and RECREATIONAL risk propensity respectively. That means that, on average, the more reckless the driving style, the more frequently risky decisions are taken. Moreover, DRIVING STYLE does not differ between men and women (p=0.2) but risk propensity differs significantly between sexes in every domain (p=0.00006 (F), p=0.0055 (S), p= 0.021 (R)) with women being less tolerant of risk. With these oft-encountered gender differences in mind, an additional U-Mann-Whitney test was conducted which showed that DRIVING STYLE only influences the decision on UBI policy offered in question 7 among men (p=0.032). For women, there is no significant difference between those who would decide to buy it and those who would not (p=0.21).

Table 1

Median and mean values of selected variables for subjects who would and would not accept the offer presented in Question no 7 and p-values for U Mann-Whitney test for the difference between presented medians

Variable	Median value among those who would accept the offer	Mean value among those who would accept the offer	Median value among those who would NOT accept the offer	Mean value among those who would NOT accept the offer	p-value for U-Mann-Whitney test
DRIVING STYLE	12	11.72581	13	12.69492	0.012
SPEEDING IN BUILT-UP AREAS	2	2.435484	3	2.771186	0.029
NIGHT DRIVING	2	1.951613	2	2.245763	0.009
VALUING ONE'S PRIVACY	5.5	5.20968	7	7	0.000008
FINANCIAL	14	15.40323	12	14.18644	0.165210
SAFETY	17	17.96774	18	18.11864	0.901772
RECREATIONAL	22	21.64516	24	23.11017	0.251409
INVESTING 10% OF INCOME… (Q24)	3	3.20968	2.5	2.71186	0.016162

Source: own elaboration

Further analysis will focus on the variable ACCEPTANCE that is measured on a six-point scale. Rank 1 means the strongest acceptance of UBI and Rank 6 means the weakest (or no) acceptance of UBI, because Rank 6 was assigned to respondents that were not willing to buy a UBI policy even when they could receive a 50% discount on their insurance premium for demonstrating a suitable driving style (and no increase in their premium for reckless driving). Distribution of the variable ACCEPTANCE is presented in Table 2.

Table 2

Distribution of the variable ACCEPTANCE

ACCEPTANCE rank	Number of observations
1	73
2	12
3	15
4	5
5	29
6	47

Source: own elaboration

Firstly, chi-squared tests were conducted to verify if gender, place of residence, education, marital status and having children affect the variable ACCEPTANCE. The tests showed that ACCEPTANCE is not dependent on any of those variables. For gender, marital status and having children (with ACCEPTANCE as the dependent variable) the results were confirmed by conducting U-Mann-Whitney tests, and for place of residence the results were confirmed by conducting a Kruskal-Wallis test by ranks (with ACCEPTANCE as the dependent variable). For level of education, the Kruskal-Wallis test showed a difference at $p=0.0446$. The rank correlation coefficient was low and not significant between age and ACCEPTANCE. Furthermore, it appears that there is no significant correlation between ACCEPTANCE and DRIVING STYLE, FINANCIAL, SAFETY and RECREATIONAL risk propensity. Inside those variables there are, however, variables correlated with ACCEPTANCE. Surprisingly there is a negative correlation between

ACCEPTANCE and frequency of hard braking ($p<0.01$) and always being in a hurry ($p<0.03$). A negative correlation in that case means that someone estimating his/her frequency of hard braking as more frequent (someone agreeing more strongly that he/she is always in a hurry) is also more willing to accept a UBI policy on average. Also, a negative correlation ($p<0.03$) was found between ACCEPTANCE and the responses to question 24 (investing money in a trust fund). As in the case of question 7, there is also a positive correlation between ACCEPTANCE and valuing one's privacy ($p<0.01$). An additional analysis conducted separately for men and women showed that for men there is only a positive correlation between ACCEPTANCE and valuing one's privacy ($p<0.01$) and the probability of engaging in unprotected sex ($p<0.03$). For women, instead, there is a negative correlation between ACCEPTANCE and frequency of hard-braking ($p<0.04$) and the probability of investing money in a trust fund ($p<0.03$). Just as for men, among women there is a positive correlation between ACCEPTANCE and valuing one's privacy ($p<0.03$).

Lastly, the respondents were divided into two groups. Group 1 ($n=133$) is composed of those who finally accepted the UBI policy offer (those who answered 'Yes' to any of the questions from 8 to 12). Group 2 ($n=47$) are those who never accepted the UBI policy offer in the survey (those who answered 'No' to each of the questions from 8 to 12). The mean and median values of DRIVING STYLE, FINANCIAL, SAFETY and RECREATIONAL risk propensity variables for that groups are shown in Table 3.

Table 3

The mean and median values of DRIVING STYLE, FINANCIAL, SAFETY and RECREATIONAL risk propensity variables and p-value for U-Mann-Whitney test for differences between those who finally accepted and never accepted UBI policy offer

Variable	UBI policy offer finally accepted			UBI policy never accepted			p-value for U-Mann-Whiney test
	Mean	Median	N	Mean	Median	N	
DRIVING STYLE	12.25373	12	134	12.65957	13	47	0.401113
FINANCIAL	14.55970	13	134	14.55319	12	47	0.832161
SAFETY	17.01493	17	134	20.87234	21	47	0.00225
RECREATIONAL	21.61194	21	134	25.12766	25	47	0.0168

Source: own elaboration

In order to check whether those variables are somehow connected with attitude to UBI policies, U-Mann-Whitney tests were conducted with DRIVING STYLE, FINANCIAL, SAFETY and RECREATIONAL risk propensity as dependent variables and Group as an independent variable. The results show that there are significant differences between groups in terms of SAFETY ($p=0.00225$) and RECREATIONAL ($p= 0.0168$) risk propensity. Additional tests also showed a difference ($p= 0.0115$) between groups in terms of night driving, with Group 2 driving at night more often. A significant difference was also found for question 20 about always being in a hurry ($p=0.0066$) and question 21 regarding valuing one's privacy ($p= 0.00008$). Surprisingly, those who on average agreed to a larger extent with the statement 'I'm always in a hurry' were those who finally decided they would be willing to buy a UBI policy (the median values equalled 4 for Group 1 and 3 for Group 2). As for privacy, Group 1 valued it lower (with a median value equal to 6) than Group 2 (median 7). The self-assessment of participants pertaining to being an experienced driver and driving the car dynamically did not differ between groups.

Results – Spain

28 respondents (54.9%) claimed that they would agree to install a device monitoring their driving style in their car if the data from this device influenced the amount of the insurance premium for their vehicle (question 7). Similarly to the Polish results, in order to check which factors affect the answer to that question, chi-squared tests were firstly conducted for qualitative variables and U-Mann-Whitney tests for ordinal variables (see Table 4). Based on that, it can be said that there are no differences in willingness to accept a UBI policy proposal between men and women (p=0.88), place of residence (p=0.34), marital status (p=0.93), highest level of education completed (p=0.54) and between respondents with and without children (p=0.36). No difference in average age was also found between those who answered yes and no to question number 7 (p=0.81). As with the Polish sample, based on the U-Mann-Whitney test, there are differences between those who agreed to buy UBI in terms of DRIVING STYLE (p=0. 026). The median value of DRIVING STYLE is 10 for those who would agree to buy the policy and 12 for those who would not buy it. The main reason for that difference seems to be differences in exceeding the speed limit in built-up areas (p= 0.036) and braking hard (p=0.047). A significant difference was also found in valuing one's privacy (p=0.013). No significant difference was found in terms of risk propensity in any domain (p=0.56, p=0.46, p=0.51).

Table 4

Median and mean values of selected variables for subjects who would and would not accept the offer presented in Question no 7 and p-values for U Mann-Whitney test for the difference between presented medians.

Variable	Median value among those who would accept the offer	Mean value among those who would accept the offer	Median value among those who would NOT accept the offer	Mean value among those who would NOT accept the offer	p-value for U-Mann-Whitney test
DRIVING STYLE	10	9.5833	12	11.7368	0.026
SPEEDING IN BUILT-UP AREAS	2	1.9583	3	2.68421053	0.036
BRAKING HARD	2	1.6667	2	1.8947	0.047
VALUING ONE'S PRIVACY	5.5	5.4583	7	6,4211	0.013
FINANCIAL	10	11.875	12	12.8947	0.56
SAFETY	13	12.6667	14	14.8947	0.46
RECREATIONAL	17.5	16.75	17	17.6316	0.51

Source: own elaboration

Next, the answers to questions 8 to 12 were analysed. 76,5% of respondents stated they would be willing to buy a UBI policy if they could receive a 10% discount. Only 4 (7,8%) respondents would not accept a monitoring device in their car even if the discount was 50%. Due to the distribution of answers, further analysis may be biased. No significant correlation (for rank coefficient) was found between the variable ACCEPTANCE and DRIVING STYLE, FINANCIAL, RECREATIONAL and SAFETY risk propensity. As with the Polish answers, positive correlation also exists for the Spanish results between the variable DRIVING STYLE and risk propensity, equal to 0.41 ($p<0.01$) and 0.33 ($p<0.02$) for SAFETY and RECREATIONAL risk propensity respectively. Contrary to the Polish results, no significant correlation was found between DRIVING STYLE and FINANCIAL risk propensity.

5. CONCLUSIONS AND DISCUSSION

The purpose of this paper was to empirically verify the assumption that usage-based insurance policies are on average bought by safer drivers. Previous research has shown that drivers whose insurance premium depends on how they drive have on average lower claims than those whose premiums are calculated in a traditional way (e.g. Ernst&Young Report, 2015). However, this does not have to mean that it is because safer drivers buy UBI. It may well be caused by drivers' willingness to save money by changing their driving habits. In order to check the direct influence of driving style on willingness to accept UBI policy, a questionnaire was conducted in two countries with different cultures – Poland and Spain. In both countries there was a statistically significant difference in terms of driving style between those who would be willing to accept a device monitoring their driving style if for a safer than average driving style their premium would be lower than the average, and for a less safe than average driving style their premium would be higher than the average. Also, in neither of the countries was a difference found between risk propensity (in different domains) for those who would install a monitoring device on the terms given above. In both countries a statistically significant correlation was found between HEALTH and RECREATIONAL risk propensity and driving style. To measure level of UBI acceptance, five questions were used that offered only discounts ranging from 10% to 50% (no surcharges) for safe driving. Based on those questions, the variable ACCEPTANCE was created that showed the moment of switching from answering 'no' to the given offer to 'yes'. That variable turns out not to be correlated with driving style and risk propensity in any domain; however, the lack of significant correlation may be caused by the small sample size. In future research the assumption is that the questionnaire will be distributed to a larger, possibly representative sample. For Poland, where a larger sample was collected, an additional analysis was conducted with respondents divided in two groups. Group 1 was composed of those who finally accepted the UBI policy offer, while Group 2 were those who declined to do so. Between those groups, a significant difference in SAFETY and RECREATIONAL risk propensity was found. Also, in Poland, respondents' willingness to install a monitoring device was largely hampered by the need for privacy. Said factor did not appear important in the results from the Spanish research sample.

To sum up, hypothesis 1 stating that an individual's self-reported driving style is correlated with willingness to buy a policy contract based on UBI was partially supported by our research. In the case of a policy that would be subject to surcharges and discounts depending on driving style, this factor influences the willingness to accept installation of a monitoring device in one's car. In that part the results are in line with results obtained by Seger and Figl (2019). As pointed out by some authors (see e.g. Cather, 2018; Arvidsson, 2011; Karapiperis et al., 2015) this could lead to a situation where drivers with a riskier driving style choose an insurance company where they do not have to use a telematics system. This could have financial consequences both for insurance companies (possible higher claims, higher probability of loss) but also for policyholders (higher premiums associated with higher risk). However, in the long term, due to the above mentioned financial incentives, this should encourage insured persons to use UBI. This means, however, that the introduction of UBI would improve security in general, which can be seen as an advantage. It is certainly an important issue to be investigated what scale of financial incentives (in the form of lower premiums) would induce persons with risky driving behaviour to change their driving style. This should be treated as a research problem, which will be the subject of further investigation.

Hypothesis 2 stating that an individual's risk propensity affects his/her willingness to buy a policy contract based on UBI was weakly supported in Poland, where levels of SAFETY and RECREATIONAL of two groups (who accepted and never accepted UBI respectively) were compared. The difference can result from different preferences to UBI but could also be reflection of different willingness to getting insurance in general. For example Jaspersen et al. (2022) found positive correlation between different measures of risk aversion (utility curvature, loss aversion, probability weighting) and insurance demand.

Based on the obtained results it seems that the driving style has a greater influence on the acceptance of the UBI when drivers are threatened with an increase in the price of insurance for unsafe driving, which seems to be logical. By contrast, until now, most insurance companies offer UBI products that only give a safe driving discount. Therefore, one cannot be sure that only low risk drivers will be tempted by these products. Insurance companies should rethink their strategy in this regard, as the use of UBI may lead to adverse selection of drivers. The implementation of telematics solutions should therefore be based not solely on the reduction in premiums but be linked to the fact that failure to adopt such solutions will result in higher premiums.

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REFERENCES

Abdel-Aty M.A., Radwan A.E.. (2000). Modeling traffic accident occurrence and involvement, *Accident Analysis and Prevention*, 32 (5), 633-642.

Akerlof G.A. (1970). The Market for 'Lemons': Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics*, 84(3), 488-500.

Anderloni, L., & Vandone, D. (2011). Risk of over-indebtedness and behavioural factors. In: Lucarelli C, Brighetti G (eds) Risk tolerance in financial decision making. Palgrave Macmillan Press, London, 113-132.

Arvidsson, S. (2011). Reducing asymmetric information with usage-based automobile insurance. Swedish National Road; Transport Research Institute (VTI)

Azadeh A., Zarrin M., Hamid M. (2016). A novel framework for improvement of road accidents considering decision-making styles of drivers in a large metropolitan area, *Accident Analysis & Prevention*, 87, 17-33.

Battalio R. C., Kagel J. H., MacDonald D. N. (1985). Animals' choices over uncertain outcomes: Some initial experimental results, *The American Economic Review*, 75(4), 597-613.

Becker J.G., Erny M., (2021). Attitudes towards personalized insurance tariff models: a survey among students, SML *Working Paper*, 17, doi: 10.21256/zhaw-21745, source: https://digitalcollection.zhaw.ch/handle/11475/21745, accessed January 16th 2022

Belas, J., Koraus, M., & Gabcova, L. (2015). Electronic Banking, Its Use And Safety. Are There Differences In The Access Of Bank Customers By Gender, Education And Age? *International Journal of Entrepreneurial Knowledge*, 3(2), 16-28.

Bernat T., Hawran K. Kowalik J. (2016). Asymetria informacji w modelu pryncypał-agent – wyniki badań eksperymentalnych. *Przedsiębiorstwo i Region*, 8, 65-75

Blais, A.R., & Weber, E.U. (2006). A Domain-Specific Risk-Taking (DOSPERT) scale for adult populations. *Judgment and Decision Making*, 1, 33-47.

Bolderdijk, J. W., Knockaert, J., Steg, E. M., & Verhoef, E. T. (2011). Effects of Pay-As-You-Drive vehicle insurance on young drivers' speed choice: Results of a Dutch field experiment. *Accident Analysis & Prevention*, 43(3), 1181-1186.

Byrnes J. P., Miller D. C., Schafer W. D. (1999). Gender differences in risk taking: a meta-analysis. *Psychological Bulletin* 125(3), 367-383.

Cather D.A. (2018). Cream Skimming: Innovations in Insurance Risk Classification and Adverse Selection. *Risk Management and Insurance Review*, 1(2), 335-366.

Che, X., Liebenberg, A., & Xu, J. (2021). Usage-Based Insurance—Impact on Insurers and Potential Implications for InsurTech. *North American Actuarial Journal*, 1-28.

Chiappori P.A., Salanie B. (2000). Testing for Asymmetric Information in Insurance Markets. *Journal of Political Economy*, 108(1), 56-78.

Biener Ch., Eling M., Lehmann M. (2020). Balancing the desire for privacy against the desire to hedge risk, *Journal of Economic Behavior & Organization*, 180, 608-620.

Dang J. (2022). The impact of telematics on the motor insurance landscape and on customer behaviour in the case of Italy, Bachelor Thesis, University of Zurich, source: https://www.business.uzh.ch/dam/jcr:6f2f17b3-dead-4be2-9965-038e8b3e3255/Dang_thesis.pdf, accessed January 17th 2022

Dankiewicz R., Ostrowska-Dankiewicz A., & Bulut C. (2020). The attitudes of entrepreneurs of the small and medium-sized enterprises sector in Poland to key business risks. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 15(3), 511–536.

Dankiewicz R. (2020). Single cover as a supplement to the product offer of trade credit insurers used in risk management processes in enterprises, *International Journal Business Performance Management*, 21(4), 400-416.

Derikx, S., de Reuver, M., & Kroesen, M. (2016). Can privacy concerns for insurance of connected cars be compensated? *Electronic Markets*,26(1), 73–81.

Dickerson A., Peirson J., Vickerman R.. (2000). Road accidents and traffic flows: an econometric investigation, *Economica*, 67(265), 101-121.

Dionne, G., C. Gourieroux, and C. Vanasse, (2001). Testing for Evidence of Adverse Selection in the Automobile Insurance Market: A Comment, *Journal of Political Economy*, 109, 444-453.

Ernst&Young. (2015). Usage Based Insurance. The New Normal?

Fan C.K., Wu X., Zheng D, Lin W. (2016). A Market Analysis of Telematics-Based UBI in Taiwan, *Journal of Applied Finance & Banking*, 6(6), 71-89.

Golob T.F., Recker W.W. (2003). Relationships among urban freeway accidents, traffic flow, weather, and lighting conditions, *Journal of Transportation Engineering*, 129 (4), 342-353.

Guillen, M., Nielsen, J. P., Pérez-Marín, A. M., & Elpidorou, V. (2020). Can automobile insurance telematics predict the risk of near-miss events?. *North American Actuarial Journal*, 24(1), 141-152.

Horvath, J., Gavurova, B., Bacik, R. & Fedorko, R. (2021). Identification of Uncertainty Factors in the Consumer Behaviour of the New Generation of Customers at the E-commerce Level. *Journal of Tourism and Services*, 22(12), 168-183.

Jaspersen, J., Ragin, M., and J. Sydnor. (2022). Predicting insurance demand from risk attitudes. *The journal of risk & insurance*, 89(1), 63-96.

Karapiperis D., Birnbaum B., Brandenburg A., Castagna S., Greenberg A., Harbage R. and A. Obersteadt (2015). Usage-Based Insurance and Vehicle Telematics: Insurance Market and Regulatory Implications, CIPR Study, source: https://content.naic.org/sites/default/files/inline-files/cipr_study_150324_usage_based_insurance_and_vehicle_telematics_study_series_1.pdf, accessed: January 15th 2022

Kruger, J., & Dunning, D. (1999). Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of Personality and Social Psychology*, 77(6), 1121–1134. https://doi.org/10.1037/0022-3514.77.6.1121

Kwarteng, M. A., Pilik, M. (2016). Exploring consumers' propensity for online shopping in a developing country: A demographic perspective. *International Journal of Entrepreneurial Knowledge*, 4(1), 90-103.

Lord D., Manar A., Vizioli A. (2005). Modeling crash-flow-density and crash-flow-V/C ratio relationships for rural and urban freeway segments, *Accident Analysis and Prevention*, 37 (1), 185-199.

Mather, M., Mazar, N., Gorlick, M. A., Lighthall, N. R., Burgeno, J., Schoeke, A., & Ariely, D. (2012). Risk preferences and aging: The "certainty effect" in older adults' decision making. *Psychology and Aging*, 27(4), 801–816.

McCormick, I. A., Walkey, F. H., & Green, D. E. (1986). Comparative perceptions of driver ability—a confirmation and expansion. *Accident Analysis & Prevention*, 18(3), 205-208.

Nemanja M., š Milosavljević M., Benković S., Starčević D., and o Spasenić Ž. (2020). An Acceptance Approach for Novel Technologies in Car Insurance, *Sustainability* 12 (24), 10331. https://doi.org/10.3390/su12241033

Paefgen, J., Staake, T., & Fleisch, E. (2014). Multivariate exposure modeling of accident risk: Insights from Pay-as-you-drive insurance data. *Transportation Research Part A: Policy and Practice*, 61, 27-40.

Pugnetti C., Seitz M. (2021). Data-Driven Services in Insurance: Potential Evolution and Impact in the Swiss Market, *Journal of Risk and Financial Management*, MDPI, 14(5), 1-16.

Quintero J. & Benenson Z. (2019). Understanding Usability and User Acceptance of Usage-Based Insurance from Users' View. In Proceedings of the 2019 2nd International Conference on Machine Learning and Machine Intelligence (MLMI 2019). Association for Computing Machinery, New York, NY, USA, 52–57. DOI:https://doi.org/10.1145/3366750.3366759

Reimers I., Shiller B. (2018). Welfare Implications of Proprietary Data Collection: An Application to Telematics in Auto Insurance, Working Papers 119R, Brandeis University, Department of Economics and International Business School, source: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3125049, accessed: January 15th 2022

Rejikumar G. (2013). A pre-launch exploration of customer acceptance of usage based vehicle insurance policy, *IIMB Management Review*, 25(1), 19-27.

Ronay, R., Kim, D. Y. (2006). Gender differences in explicit and implicit risk attitudes: A socially facilitated phenomenon. *British Journal of Social Psychology*, 45(2), 397-419.

Rothschild, M., and Stiglitz, J. (1976). Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information. *Quarterly Journal of Economics*, 90(4), 629-649.

Sahebi, S., & Nassiri, H. (2017). Assessing public acceptance of connected vehicle systems in a new scheme of usage-based insurance. Transportation Research Record: *Journal of the Transportation Research Board*, 2625 ,62–69.

Seger, F.; Figl, K. (2019): Influence Factors for Customer Acceptance of Data-Driven Contracts in Insurance Ecosystems. In: *Proceedings ICIS 2019 Pre-Conference*

Siegelman P. (2004). Adverse Selection in Insurance Markets: An Exaggerated Threat, *Yale Law Journal*, 113(6), 1123 – 1281.

Skłodowski, H. (2007). Psychologia kierowcy samochodowego. Toruń: Wydawnictwo Adam Marszałek.

Śliwiński, A., & Kuryłowicz, Ł. (2021). Usage-based insurance and its acceptance: An empirical approach. *Risk Management and Insurance Review*, 24(1), 71-91, https://doi.org/10.1111/rmir.12165

Soleymanian M., Weinberg C., Zhu T. (2021). Privacy Concerns, Economic Benefits, and Consumer Decisions: A Multi-Period Panel Study of Consumer Choices in the Automobile Insurance Industry (August 13, 2021). Available at SSRN: https://ssrn.com/abstract=3905034 or http://dx.doi.org/10.2139/ssrn.3905034, accessed January 17th 2022

Studenski, R. (2004). Ryzyko i ryzykowanie. Katowice: Wydawnictwo Uniwersytetu Śląskiego.

Svenson, O. (1981). Are we all less risky and more skillful than our fellow drivers?. *Acta psychologica*, 47(2), 143-148.

Trimpop, R., & Kirkcaldy, B. (1997). Personality predictors of driving accidents. *Personality and Individual Differences*, 23(1), 147–152.

Tselentis D., Theofilatos A., Yannis G., Konstantinopoulos M. (2018). Public opinion on Usage-Based Motor Insurance Schemes: a stated preference approach. *Travel Behaviour and Society*, 11, 111-118.

Tyszka T., Domurat A., (2004). Czy istnieje ogólna skłonność jednostki do ryzyka?, *Decyzje 2*, 85-104.

Wilson, M., & Daly, M. (1985). Competitiveness, risk taking, and violence: The young male syndrome. *Ethology and sociobiology*, 6(1), 59-73.

Zhou L., Du S., Zhu H., Chen C., Ota K., Dong M. (2019). Location Privacy in Usage-Based Automotive Insurance: Attacks and Countermeasures, in IEEE *Transactions on Information Forensics and Security*, 14(1), 196-211.

APPENDIX

APPENDIX I LIST OF QUESTIONNAIRE'S QUESTIONS

Question number	Question	Answers [Units/Scale]
1	Gender	M/F/Other/Refuse to answer
2	Age	[years]
3	Place of residence	Rural area / A city with a population of up to 50,000 inhabitants / A city with a population of 50,001 to 100,000 inhabitants / A city with a population of 100,001 to 500,000 inhabitants / A city with a population of over 500,000 inhabitants
4	Highest level of education	Primary/Secondary vocational education/General secondary education/Bachelor studies (undergraduate)/Master studies (graduate)/Engineering studies/Other(indicate)
5	Marital status	Single/Not single/Refuse to answer
6	Do you have children	Yes/No/Refuse to answer
7	Would you agree to install a device monitoring your driving style in your car, if the data from this device influenced the amount of the insurance premium for your vehicle? So for a safer than average driving style your premium would be lower than the average, and for a less safe than average driving style your premium would be higher than the average.	Yes/No
8	Would you agree to the installation of a device monitoring your driving style in your car, if you knew that for safe and legal driving, the price of the insurance policy for your car would be reduced by 10%(but this would not involve an increase in the insurance premium in the event of Your driving style did not meet the requirements of safe driving)?	Yes/No
9	Would you agree to the installation of a device monitoring your driving style in your car, if you knew that for safe and legal driving, the price of the insurance policy for your car would be reduced by 20% (but this would not involve an increase in the insurance premium in the event of Your driving style did not meet the requirements of safe driving)?	Yes/No
10	Would you agree to the installation of a device monitoring your driving style in your car, if you knew that for safe and legal driving, the price of the insurance policy for your car would be reduced by 30% (but this would not involve an increase in the insurance premium in the event of Your driving style did not meet the requirements of safe driving)?	Yes/No
11	Would you agree to the installation of a device monitoring your driving style in your car, if you knew that for safe and legal driving, the price of	Yes/No

	the insurance policy for your car would be reduced by 40% (but this would not involve an increase in the insurance premium in the event of Your driving style did not meet the requirements of safe driving)?	
12	Would you agree to the installation of a device monitoring your driving style in your car, if you knew that for safe and legal driving, the price of the insurance policy for your car would be reduced by 50% (but this would not involve an increase in the insurance premium in the event of Your driving style did not meet the requirements of safe driving)?	Yes/No
13	How often do you exceed the speed limit in built-up areas?	Never [1] / Almost never [2] / Sometimes [3] / Almost always [4] / Always [5]
14	How often do you exceed the speed limit outside the built-up area?	Never [1] / Almost never [2] / Sometimes [3] / Almost always [4] / Always [5]
15	How often do you brake hard?	Never [1] / Almost never [2] / Sometimes [3] / Almost always [4] / Always [5]
16	How often are you nervous that other drivers are moving too slowly when the green light comes on?	Never [1] / Almost never [2] / Sometimes [3] / Almost always [4] / Always [5]
17	How often do you drive between 10 p.m. and 5 a.m.?	Never when I drive[1] / Almost never when I drive [2] / Sometimes when I drive [3] / Almost always when I drive [4] / Always when I drive [5]
18	To what extent do you agree with the statement "I am an experienced driver"?	I fully disagree [1], I fully agree [7]
19	To what extent do you agree with the statement "I drive dynamically"?	I fully disagree [1], I fully agree [7]
20	To what extent do you agree with the statement "I'm always in a hurry somewhere"?	I fully disagree [1], I fully agree [7]
21	To what extent do you agree with the statement "I highly value my privacy"?	I fully disagree [1], I fully agree [7]
	In the following questions, indicate the likelihood with which you would be involved in each of the activities listed if you found yourself in this situation. Rate this probability from 1 to 7 on the following scale: 1 very unlikely / 2 unlikely / 3 rather unlikely / 4 it's hard to say / 5 rather likely / 6 likely / 7 very likely	
22	A camping trip in the wild <Recreational risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
23	Staking your daily income in horse racing <Financial/gambling risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
24	Investing 10% of your annual income in a trust fund with an average growth rate (i.e. a fund that is 40% government bonds or treasury bills and 60% equities) <Financial risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
25	4. Drinking heavily at a social function <Health/Safety risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
26	Betting a day's income at a high-stake poker game <Financial/gambling risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]

27	Going down a ski run that is beyond your ability <Recreational risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
28	Investing 5% of your annual income in high-risk speculative stocks (e.g. start-ups, growing companies) <Financial risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
29	Going whitewater rafting at high water in the spring <Recreational risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
30	Betting a day's income on the outcome of a sporting event <Financial/gambling risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
31	Engaging in unprotected sex (answer not obligatory) <Health/Safety risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
32	Driving a car without wearing a seat belt <Health/Safety risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
33	Investing 10% of your annual income in a new and risky business venture <Financial risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
34	Taking a skydiving class <Recreational risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
35	Riding a motorcycle without a helmet <Health/Safety risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
36	Sunbathing without sunscreen <Health/Safety risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
37	Bungee jumping off a tall bridge <Recreational risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
38	Piloting a small plane <Recreational risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]
39	Walking home alone at night in an unsafe area of town <Health/Safety risk>	Very unlikely [1] / Unlikely [2] / Rather unlikely [3] / It's hard to say [4] / Rather likely [5] / Likely [6] / Very likely [7]

Source: own elaboration

APPENDIX II

Table A

Participants' residence type (Poland)

Residence	Percentage
Rural area	27%
A city with a population of up to 50,000 inhabitants	16%
A city with a population of 50,001 to 100,000	8%
A city with a population of 100,001 to 500,000 inhabitants	4%
A city with a population of over 500,000 inhabitants	44%

Source: Authors' results

Table B

Participants' highest education level completed (Poland)

Education	Percentage
Primary	3.3%
Secondary vocational education	9.4%
General secondary education	34.8%
Bachelor studies (undergraduate)	16.6%
Master studies (graduate)	24.9%
Engineering studies	7.7%
PhD	3.3%

Source: Authors' results

Table C

Participants' residence type (Spain)

Residence	Percentage
A city with a population of up 2000 to 50,000 inhabitants	13.73%
A city with a population of 50,001 to 100,000	11.76%
A city with a population of 100,001 to 500,000 inhabitants	31.37%
A city with a population of over 500,000 inhabitants	43.14%

Source: Authors' results

Table D

Participants' highest education level completed (Spain)

Education	Percentage
Primary	1.96%
Techincial	1.96%
Bachelor studies (undergraduate)	19.61%
Master studies (graduate)	76.47%

Source: Authors' results